Introduction

Accessibility has become an increasingly critical topic for corporate environments and government agencies. This has resulted in growing attention from the research and technical communities, making it timely to devote this issue of the *IBM Systems Journal* to this subject.

We have observed an evolutionary process in the accessibility arena with respect to technical focus as well as deployment needs. IBM has enjoyed a long and rich history in accessibility deployments, having invented many of the early examples of assistive technologies, such as a remote control keyboard in the 1950s, a talking typewriter in the 1960s, and a Braille printer in the 1970s. Nonetheless, a strong cross-business focus on accessibility began only in the 1990s, partly driven by intensified legislation mandating that applications, services, and hardware meet guidelines for access. The focus shifted from assistive technologies to accessible infrastructures that supported assistive technologies or in some cases obviated them entirely. This not only generated the predictable increased attention that legislation dictates, but also created a flurry of interest in accessibility for business advantage. Companies not under mandate to provide accessible applications are nonetheless requesting it. Why block out the 54 million people with disabilities in the United States, or the nearly one billion people with disabilities worldwide? Statistics indicate a rapidly aging population base worldwide. Seventy million people in the United States will be over 65 by the year 2030; 50 percent of the workforce will be over 55 by the year 2020. And with aging come many of the limitations associated with disabilities, such as reduced hearing, sight, and mobility. Inclusion of the largest possible base of customers and employees can provide companies with competitive advantages, and technology is rising to the task of greater inclusion.

As research and technology develop, it is becoming apparent that applications and services that meet the needs of people with disabilities have universal design benefits as well. Services designed flexibly to enable low-vision or blind users to access information technology are advantageous for all of us in eyes-busy settings such as driving. Applications that build in visual redundancy to audio information, such as captioning, benefit everyone in settings that are noisy, or when high bandwidth access is unavailable. From this point of view, disability broadens into a continuum that includes invisible disabilities, such as color blindness and attention deficits, as well as situational disabilities, such as limited access to information technologies.

Fully accessible information technology remains a goal, not a current state. There are a number of reasons for the gaps between the potential and the reality. In some cases, the issue is expense. We know what needs to be done, but how can it be imposed and implemented on the billions of Web pages that are now available? In other cases, the technical community is still exploring how accessibility should be deployed: Should end users have specialized assistive devices and software, or should accessibility be integral to all applications? What, ultimately, is acceptable accessibility? Is ability to access information adequate, or is there a way to ensure that the experience of a user who has low vision or is hard of hearing is comparable to the experience of sighted and hearing users?

IBM's Accessibility Center has adopted a four-tier model for accessibility, which helps to communicate its vision and maps the journey from the lowest level of basic compliance to the highest level of fully accessible supply chain integration. *Tier 1* refers to basic compliance, historically driven by the need to comply with government laws and regulations. *Tier 2* reflects awareness about the *experience* that a system offers to a person with disabilities. Beyond mere access to a system, can the user have an experience comparable to a person without a disability? Can he or she access needed information as quickly, as effortlessly, and as

enjoyably? *Tier 3* adds recognition of a user's unique needs. The interface of choice is *predicted* as soon as the individual approaches an information system, and the appropriate configurations are made available. *Tier 4* assumes that accessibility is available end to end, beyond the offering of any single company or agency, along the entire supply chain continuum. The result is a more inclusive society, maximizing human potential.

The papers selected for this issue of the *Systems Journal* cover a broad spectrum of areas of interest in accessibility. They demonstrate key innovations from IBM, academia, other industries, and government, and provide insight about how to create underlying architectures that assist in enabling accessibility and making it universal. Some of the papers provide best practices for specific implementations; others provide overviews of novel technologies that are becoming fundamental to enabling broader access. Usability is a major focus because enhanced accessibility is so tightly interwoven with usability improvements.

We trust that you will find this issue of the *Systems Journal* stimulating and insightful and that it will encourage you to follow developments in this exciting field or pursue your own journey toward the research and development of increasingly accessible environments. We hope this serves as a step along a path from technical discovery to broader implementation and ultimately, new cultural norms.

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